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SPECIFICATION FOR BATCH PASTEURIZER (STAINLESS STEEL)

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Indian Standard

SPECIFICATION FOR BATCH PASTEURIZER (STAINLESS STEEL)

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 11 May 1964, after the draft finalized by the Dairy Industry Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 The batch pasteurizer is used for pasteurizing milk. It is used for operations where the volume of milk is too small to justify the use of the continuous flow HTST (High Temperature Short Time) system. This standard covers a batch pasteurizer in which the heating is done by steam injected into water. The batch pasteurizer may also be used for dairy products like cream and ice-cream mix, with suitable modified arrangements for agitation.

0.3 The batch pasteurizer consists of a cylindrical vessel enclosed in a double-walled insulated container. It is fitted with a lid and is provided with an outlet cock or valve, an agitator and other necessary accessories for heating and cooling.

0.4 Wherever a reference to any Indian Standard appears in this specification, it shall be taken as a reference to the latest version of the standard.

0.5 Metric system has been adopted in India and all quantities and dimensions in this standard have been given in this system.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960 Rules for Rounding Off Numerical Values (*Revised*). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

0.7 This standard is intended chiefly to cover the technical provisions relating to batch pasteurizer (stainless steel), and it does not include all the necessary provisions of a contract.

1. SCOPE

1.1 This standard prescribes the constructional details and dimensional requirements for stainless steel holding type batch pasteurizers of 500, 750 and 1 000 litre capacities for pasteurizing milk at 63°C for 30 minutes or any other time-temperature combination, wherein the temperature of pasteurization does not exceed 65°C, the heating being done by injecting steam into water.

2. CAPACITY

2.1 The rated capacity of the pasteurizer is the capacity to a depth of 50 mm below the top edge of the cylindrical vessel.

3. MATERIALS

3.1 All component parts, the surfaces of which come into contact with milk shall be made of stainless steel conforming to designation 07Cr19 Ni9 of Table XXXIV in IS: 1570-1961 Schedules for Wrought Steels for General Engineering Purposes.

3.2 The inner wall of the outer container shall be made of mild steel painted or otherwise made rust-proof. The outer wall of the outer container shall be made of stainless steel or of mild steel painted or otherwise made rust-proof, as desired by the purchaser.

3.3 All other parts, surfaces of which do not come into contact with the milk, shall be made of a material which is either corrosion-resistant or is rendered corrosion-resistant by a suitable preservative treatment on a prepared rust-free surface.

4. SHAPE AND DIMENSIONS

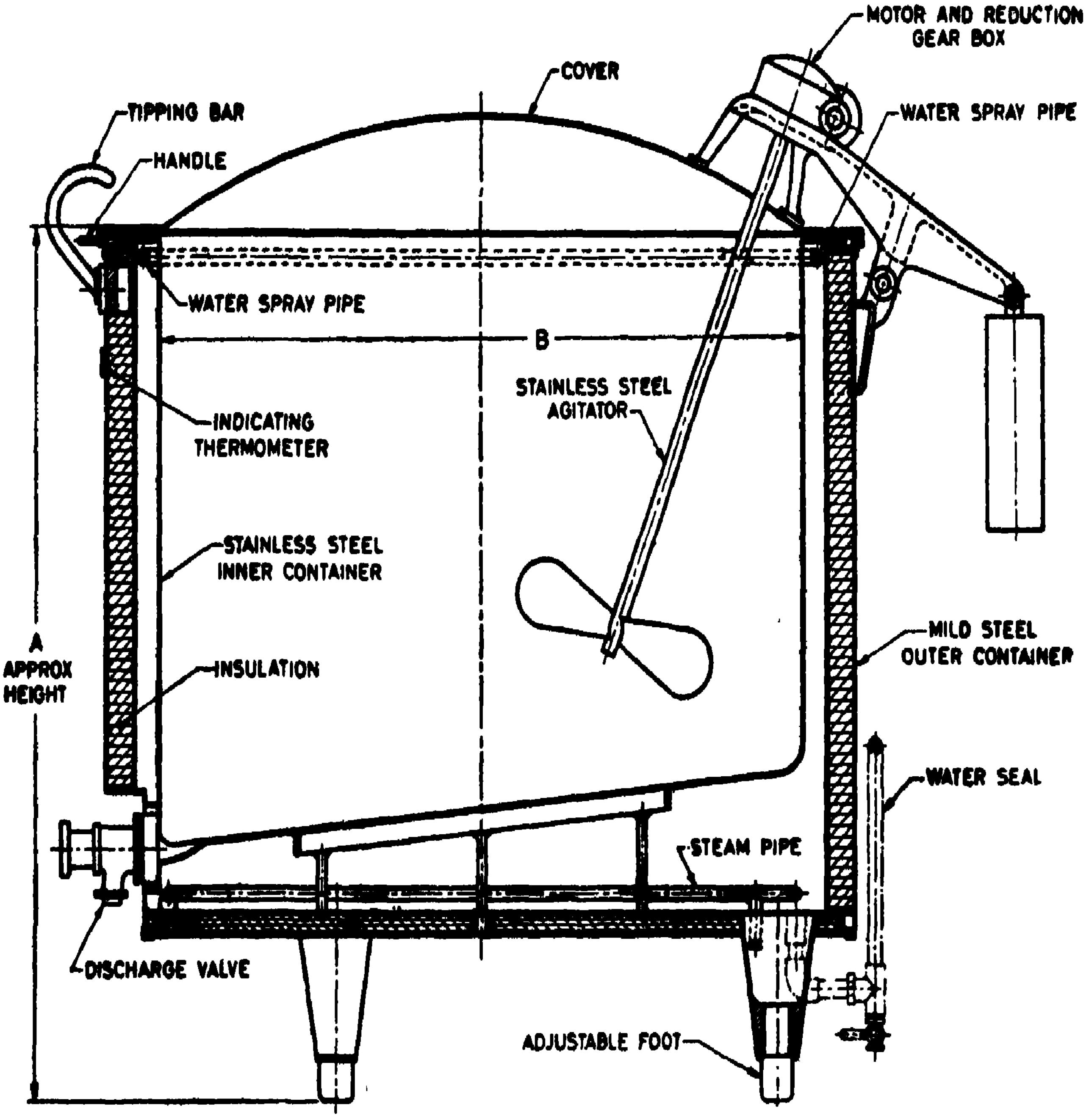
4.1 The batch pasteurizer shall conform in design to Fig. 1 or Fig. 2. Dimensions shown in the figures are only approximate. Variations shall be permitted so long as the batch pasteurizer meets the other requirements of the standard and works efficiently.

5. FABRICATION

5.1 Inner Container — All surfaces which come into contact with the milk shall be finished smooth and all corners shall be rounded off to a radius of not less than 6 mm.

5.1.1 All joints which come into contact with the milk shall be welded and finished smooth.

5.1.2 The top edges shall be flanged and shaped as shown in Fig. 1 or Fig. 2. The bottom shall be sloped and also dished at the portion adjacent to the outlet valve as shown in the figures. The top portion of the pasteurizer shall be so designed as to ensure that no external condensate flows into the inner vessel.



Capacity litres	*A* mm	*B* mm
1 000	1 389	1 250
750	1 284	1 150
500	1 172	1 000

Fig. 1 Typical Design of Batch Pasteurizer (Stainless Steel)

5.2 Heating and Cooling Annular Cavity — A spray pipe for letting water into the jacket at a pressure of not less than 1·5 kg/cm^2 shall be fitted near the top end of the annular space between the inner container and the outer jacket. A distributor for steam or steam injector heater shall be fitted at the bottom of the annular space. The heating system shall be equipped with a siphon-type water trap or overflow, drain-cock and steam and water connections.

5.2.1 If necessary, an arrangement for circulating hot water may be provided to achieve the specified performance.

5.3 Insulated Outer Jacket — All joints of the jacket shall be welded and smoothly finished. Alternatively, bolted connections are permitted. The annular space between the outer and the inner wall shall be filled with an insulating material. The quality and the packing density shall be such as to provide the desired insulation (*see* **10.3**).

5.4 Supporting Legs — The supporting legs shall be securely welded to the bottom of the outer container as shown in Fig. 1 or Fig. 2. The legs shall be provided with adjustable feet.

6. AGITATOR

6.1 The agitator shall consist of a smoothly and brightly finished stainless steel propeller driven by totally enclosed electric motor and reduction gear box.

6.2 The mechanisms of the agitator shall be such that it is possible to maintain the agitation throughout the holding period (a) to prevent the fat globules of milk from rising, (b) to reduce the formation of milk foams to the minimum, and (c) to ensure uniform heating.

6.3 All surfaces which come into contact with milk shall be finished smooth. All joints which come into contact with milk shall be welded and finished smooth. All concerns shall be smoothly rounded off to a minimum radius of 6 mm.

7. COVER

7.1 The cover shall perfectly fit the inner vessel. In the case of 500-litre and 750-litre pasteurizers, it shall be secured to the outer container through a hinged bracket. In the case of 1 000-litre pasteurizer, the cover, in addition to the hinged mechanism, shall be provided with a counter-balancing device for easy handling. Locking clips shall be provided to hold the cover securely to the inner container. Alternative designs of loose hinged type cover with welded-on bridge and fitting arrangement as shown in Fig. 2 are permissible so long as the cover is capable of being opened easily for cleaning and inspection of the inner vessel.

8. ACCESSORIES

8.1 The pasteurizer shall be provided with the following fittings and accessories.

8.1.1 *Flush Discharge Valve/Cock*—The pasteurizer shall be fitted with 50 mm diameter stainless steel flush closing sanitary type discharge valve/cock. The design of the valve/cock shall be such that there is no chance of milk pocket being formed in their body and fittings.

8.1.2 *Indicating Thermometer*—An indicating thermometer, having a range from 0 to 100°C with a minimum graduation of 1°C, shall be provided for reading the temperature of milk. If so desired by the purchaser, similar thermometer may be provided for the water also, and a thermometer pocket may be welded to the container for fitting the bulb of the thermometer.

8.1.3 The pasteurizer may, in addition, be provided with a suitable milk temperature recorder, if so desired by the purchaser.

8.1.4 All component parts and appurtenances, having surfaces, which come into contact with the milk products, shall be capable of being cleaned and inspected in position or by dismantling, if necessary.

8.1.5 Necessary provision shall be made for water inlet, steam inlet and for drain connections or arrangement with water seal as shown in Fig. 1. The water seal arrangement as shown in Fig. 1 shall be such as to ensure that the pressure built up in the jacket does not exceed 0·1 kg/cm^2.

8.1.6 An automatic temperature controller may be provided, if so desired by the puchaser.

9. WELDING

9.1 All welds shall be of satisfactory quality and shall be free from porosity and shall not be brittle. A filler material that deposits weld metal with a composition and structure as near as that of the material being welded shall be used.

10. TESTS

10.1 The inner stainless steel container shall be leak-proof. The inner wall of the outer container with all the fittings in position shall be leak-proof when subjected to a hydraulic pressure of 0·35 kg/cm^2.

10.2 The heating system shall be capable of heating the milk in the inner vessel from an initial temperature of 32°C to a temperature of 65°C within 30 minutes.

10.3 During the operation of the pasteurizer, the temperature of the outer surface of the outer container shall not exceed 60°C.

11. MARKING

11.1 Each pasteurizer shall be legibly and indelibly marked with the following information:

a) Manufacturer's name, trade-mark or initials;
b) Year of manufacture; and
c) Capacity of the pasteurizer.

11.1.1 Each pasteurizer may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirments of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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